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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/774,617	02/01/2001	Benny L. Danovi	A7893	3353

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SUGHRUE, MION, ZINN, MACPEAK & SEAS, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
WASHINGTON, DC 20037-3213

EXAMINER

ENSEY, BRIAN

ART UNIT	PAPER NUMBER
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2643

DATE MAILED: 06/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/774,617

Applicant(s)

DANOVI, BENNY L.

Examiner

Brian Ensey

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 4/29/03.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-58 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-52, 54, 55, 57 and 58 is/are rejected.
- 7) ☒ Claim(s) 53 and 56 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-11, 13-22, 24,26,27,33,51, 52, 54, 55, 57 and 58 are rejected under 35 U.S.C. 102(b) as being anticipated by Faraone, U.S. Patent No. 5,880,412.

Regarding claim 1 (Once amended), Faraone discloses a speaker cone comprising: a base portion having a front end (7) and a rear end (15), wherein the front end contains at least one discontinuity (9) such that a first distance from a reference point on a longitudinal axis of the base portion to a first point on the front end is different than a second distance from the reference point to a second point on the front end, wherein a latitudinal cross-section of said base portion has a shape of a closed conic section, wherein said latitudinal cross-section is located between said rear end and said at least one discontinuity, and wherein said latitudinal cross section is substantially perpendicular to said longitudinal axis (See Figs. 1-4).

Regarding claims 2, 3 (once amended) and 4 (once amended), Faraone discloses a speaker cone as claimed. Faraone further discloses a speaker cone wherein a flexural wave is radiated from the base portion past the front end when the base position vibrates, and wherein the discontinuity substantially reduces an occurrence of at least one geometric mode resonance created by the flexural wave and wherein at least one geometric mode resonance comprises an

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azimuthal mode resonance and wherein at least one geometric mode resonance comprises a radial mode resonance (See col. 1, lines 6-11).

Regarding claim 5 (once amended), Faraone further discloses a speaker cone wherein at least one discontinuity comprises a first discontinuity, wherein the first discontinuity comprises a radiating area that is substantially greater than a radiating area of a portion of the front end opposed to the first discontinuity (See Figs. 1-4).

Regarding claim 6 (once amended), Faraone further discloses a speaker cone wherein at least one discontinuity comprises a first discontinuity and a second discontinuity disposed adjacent to the first discontinuity on the front end, and wherein a radius of the front end gradually changes when traveling along the front from the first discontinuity to the second discontinuity (See Figs. 1-4).

Regarding claim 7 (once amended), Faraone further discloses a speaker cone wherein at least one discontinuity comprises a first discontinuity and a second discontinuity disposed adjacent to the first discontinuity on the front end, and wherein a height of the front end gradually changes when traveling along the front end from the first discontinuity to the second discontinuity (See Fig. 4).

Regarding claim 8, Faraone further discloses a speaker cone wherein a radius of the front end gradually changes when traveling along the front end from the first discontinuity to the second discontinuity (See Fig. 4).

Regarding claim 9 (once amended), Faraone further discloses a speaker cone wherein at least one discontinuity causes a first portion of the front end to be located in a perpendicular

plane that is perpendicular to the longitudinal axis of the base portion and causes a second portion of the front end not to be located in the perpendicular plane (See Fig. 4).

Regarding claim 10 (once amended), Faraone further discloses a speaker cone wherein at least one discontinuity causes a first portion of the front end to be different than a radius of a second portion of the front end (See Fig. 4).

Regarding claims 11 (once amended), 13 and 14, Faraone further discloses a speaker cone wherein at least one discontinuity contains a plurality of discontinuities, wherein the plurality of discontinuities is an even number of discontinuities and wherein a cross-section of the base portion (15) is circular (See Figs. 1 -4 and col. 3, lines 56).

Regarding claim 15, Faraone further discloses a speaker cone wherein the speaker cone is a whizzer cone that reproduces high frequency sounds (See Figs. 1-4 and col. 1, lines 7-12 and col. 2, lines 65-67).

Regarding claims 16-18, Faraone further discloses a speaker cone wherein at least one discontinuity comprises a plurality of discontinuities that are evenly spaced around the front end of the base portion, wherein the plurality of discontinuities have the same size and the same shape, wherein the plurality of discontinuities form a cyclical wave in the front end of the base portion (See Figs. 1-4).

Regarding claim 19 (once amended), Faraone discloses a speaker cone, comprising: a base portion having a front end and a rear end, wherein the front end contains a plurality of discontinuities that form a cyclic wave in the front end of the base portion, wherein a latitudinal cross-section of said base portion has a shape of a closed conic section, wherein said latitudinal cross-section is located between said rear end and said at least one discontinuity, and wherein

said latitudinal cross section is substantially perpendicular to said longitudinal axis (See Figs. 1-4).

Regarding claims 20-22, 24, 26 and 27, Faraone further discloses a speaker cone wherein a first distance from a reference point on a longitudinal axis of the base portion to a first point on the front end is different than a second distance from the reference point to a second point on the front end, wherein a radius of the front end at the first point is different than a radius of the front end at the second point, wherein a height of the front end at the first point is different than the height of the front end at a second point, wherein the cyclic wave is a sine wave, wherein the speaker cone is a whizzer cone that reproduces high frequency sounds, wherein a cross-section of the base portion is circular and a radius of the circular cross-section gradually increases while traveling in a direction from the rear end to the front end (See Figs. 1-4 and lines 7-12 and col. 2, lines 65-67).

Regarding claim 33, Faraone further discloses a speaker cone wherein the entire front end has an even number of discontinuities (See col. 3, lines 56).

Regarding claims 51 and 54, Faraone further discloses the shape of the latitudinal cross-section comprises a circle (See Figs. 1-4)

Regarding claims 52 and 55, Faraone further discloses substantially all latitudinal cross-sections of said base portion between said rear end and said at least one discontinuity respectively have shapes of closed conic sections, and wherein said latitudinal cross-sections are substantially perpendicular to said longitudinal axis (See Figs. 1-4).

Regarding claims 57 and 58, Faraone further discloses the base portion is designed to vibrate to produce sound of the speaker cone (See col. 2, lines 30-64).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 12, 23, 25, 28-32 and 43-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Faraone. U.S. Patent No. 5,880,412.

Regarding claim 12, 23, and 25, Faraone discloses a speaker cone as claimed. Farone does not discretely disclose the plurality of discontinuities is an odd number of discontinuities. However, Faraone teaches that there are a plurality of segments (discontinuities). Therefore, it is obvious to one of ordinary skill in the art that the number of discontinuities may be either odd or even and is merely a matter of the number of degrees each segment has been selected to span (See col. 3, line 56).

Regarding claim 28, Faraone discloses a speaker cone comprising: a base portion having a front end and a rear end, wherein the front end contains a plurality of discontinuities that form a cyclical wave in the front end of the base portion, wherein the cyclical wave is a sine wave. Faraone does not explicitly disclose the cyclic wave is defined by the equation: $r(\phi) = r_0 + (A)(\sin[m\phi]/(2\pi))$, wherein $r(\phi)$ is a distance vector from a reference point on a longitudinal axis of the base portion to the front end of the base portion of the base portion, ϕ defines a revolution angle of the vector $r(\phi)$ with respect to the longitudinal axis, and m and r_0 are constants. However, Faraone does not limit the cyclical wave formed by the front end of the whizzer cone

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to a specific sine wave configuration. It would have been obvious to one of ordinary skill in the art at the time of the invention that the cyclic wave of Faraone is merely a modified sine wave and may be achieved through modification of the standard equation of a sine wave to meet the needs of many applications such as small or large diameters or large or small amplitude excursions of the discontinuities.

Regarding claims 29 and 43, Faraone does not explicitly disclose m equals the number of discontinuities in the front end of the base portion. However, it would have been obvious to one of ordinary skill in the art at the time of the invention that m equals the number of discontinuities in the front end of the base portion since the front of the cone must cover a 360 degree circular area and each area is broken up into a number (m) of discontinuities. The constant, m , is inherent to the sin wave equation which represents the shape of the discontinuities.

Regarding claims 30 and 44, Faraone does not explicitly disclose that r_0 approximately equals an average of the maximum value of the vector $r(\phi)$ and a minimum value of the vector $r(\phi)$. However, it would have been obvious to one of ordinary skill in the art at the time of the invention that r_0 is merely a measure of the physical dimensions of the discontinuities of the cone and is inherent in the mathematical representation of the measurement in the wave equation.

Regarding claims 31 and 45, Faraone does not explicitly disclose that the cone comprises a rear wall coupled to the rear end of the said base portion, wherein the reference point is contained in a plane containing the rear wall. However, it would have been obvious to one of ordinary skill in the art at the time of the invention that the segments of the cone of Faraone be extended to form a solid cone providing a back wall at the rear end of the cone to prevent contaminants from entering the speaker unit. Also, it would have been obvious to one of ordinary

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skill in the art at the time of the invention that the reference point is the center of the rear wall since the circular equation defining the discontinuities require an origin point inherently at the center of the surrounding circumferential discontinuities.

Regarding claims 32 and 46, Faraone does not explicitly disclose that m equals the number of discontinuities in the front end of the base portion and wherein r_0 approximately equals an average of the maximum value of the vector $r(\phi)$ and a minimum value of the vector $r(\phi)$. However, it would have been obvious to one of ordinary skill in the art at the time of the invention that m equals the number of discontinuities in the front end of the base portion since the front of the cone must cover a 360 degree circular area and each area is broken up into a number (m) of discontinuities. The constant, m , is inherent to the sin wave equation which represents the shape of the discontinuities. Also, r_0 is merely a measure of the physical dimensions of the discontinuities of the cone and is inherent in the mathematical representation of the measurement in the wave equation.

5. Claims 34, 38 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Faraone, U.S. Patent No. 5,880,412 in view of Hall, U.S. Patent No. 4,727,584.

Regarding claim 34 (once amended), Faraone discloses a speaker cone comprising: a base portion having a front end (7) and a rear end, wherein the front end contains a plurality of discontinuities that form a cyclical wave in the front end of the base portion (See Fig. 4). Faraone does not explicitly disclose a side section of the base portion comprises a plurality of holes. However, Hall teaches a speaker cone wherein the side of the base portion comprises a plurality of holes (40) (See Fig. 5). It would have been obvious to one of ordinary skill in the art at the

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time of the invention to include a plurality of holes in the speaker cone to provide high frequency stability.

Regarding claims 38 and 47, Faraone discloses a speaker cone as claimed. Faraone does not explicitly disclose a side section of the base portion comprises a plurality of holes. However, Hall teaches a speaker cone wherein the side of the base portion comprises a plurality of holes (40) (See Fig. 5). It would have been obvious to one of ordinary skill in the art at the time of the invention to include a plurality of holes in the speaker cone to provide high frequency stability.

6. Claims 35, 39 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Faraone, U.S. Patent No. 5,880,412 in view of Takashi, Japanese Patent Application Publication 10-013996.

Regarding claim 35 (once amended), Faraone discloses a speaker cone comprising: a base portion having a front end (7) and a rear end, wherein the front end contains a plurality of discontinuities that form a cyclical wave in the front end of the base portion (See Fig. 4). Faraone does not explicitly disclose a side section of the base portion comprises a plurality of slits. However, Takashi teaches a speaker cone wherein the side of the base portion comprises a plurality of slits (12) (See Fig. 8). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide a plurality of slits for increased durability and heat resistance.

Regarding claims 39 and 48, Faraone discloses a speaker cone as claimed. Faraone does not explicitly disclose a side section of the base portion comprises a plurality of slits. However, Takashi teaches a speaker cone wherein the side of the base portion comprises a plurality of slits

(12) (See Fig. 8). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide a plurality of slits for increased durability and heat resistance.

7. Claims 36, 40 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Faraone, U.S. Patent No. 5,880,412 in view of Inoue, U.S. Patent No. 4,132,872.

Regarding claim 36 (once amended), Faraone discloses a speaker cone comprising: a base portion having a front end (7) and a rear end, wherein the front end contains a plurality of discontinuities that form a cyclical wave in the front end of the base portion (See Fig. 4). Faraone does not explicitly disclose a side section of the base portion comprises a plurality of ribs. However, Inoue teaches a speaker cone wherein the side of the base portion comprises a plurality of ribs (1r) (See Fig. 2). It would have been obvious to one of ordinary skill in the art at the time of the invention to include a plurality of ribs for increased strength, stiffness and durability.

Regarding claims 40 and 49, Faraone discloses a speaker cone as claimed. Faraone does not explicitly disclose a side section of the base portion comprises a plurality of ribs. However, Inoue teaches a speaker cone wherein the side of the base portion comprises a plurality of ribs (1r) (See Fig. 2). It would have been obvious to one of ordinary skill in the art at the time of the invention to include a plurality of ribs for increased strength, stiffness and durability.

8. Claims 37, 41 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Faraone as applied to claims 36, 28 and 42 above, and further in view of Hall and Takashi

Regarding claims 37, 41 and 50, Faraone discloses a speaker cone as claimed. Faraone does not explicitly disclose a side section of the base portion comprises a plurality of holes and a plurality of slits. However, Hall teaches a speaker cone wherein the side of the base portion

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comprises a plurality of holes (40) (See Fig. 5) and Takashi teaches a speaker cone wherein the side of the base portion comprises a plurality of slits (12) (See Fig. 8). It would have been obvious to one of ordinary skill in the art at the time of the invention to include both a plurality of holes and slits in the cone to provide high frequency stability and still maintain strength, stiffness and durability of the cone.

Regarding claim 42, Faraone discloses a whizzer cone that reproduces high frequency sounds comprising: a base portion having a front end and a rear end, wherein the front end contains a plurality of discontinuities that form a cyclical wave in the front end of the base portion, wherein the cyclical wave is a sine wave. Faraone does not explicitly disclose the cyclic wave is defined by the equation: $r(\phi) = r_0 + (A)(\sin[m\phi]/(2\pi))$, wherein $r(\phi)$ is a distance vector from a reference point on a longitudinal axis of the base portion to the front end of the base portion of the base portion, ϕ defines a revolution angle of the vector $r(\phi)$ with respect to the longitudinal axis, and m and r_0 are constants. However, Faraone does not limit the cyclical wave formed by the front end of the whizzer cone to a specific sine wave configuration. It would have been obvious to one of ordinary skill in the art at the time of the invention that the cyclic wave of Faraone is merely a modified sine wave and may be achieved through modification of the standard equation of a sine wave to meet the needs of many applications such as small or large diameters or large or small amplitude excursions of the discontinuities.

Allowable Subject Matter

Claims 53 and 56 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

Applicant's arguments, see page 13, section III A and page 14, section IV, filed 4/29/03, with respect to the rejection(s) of claim(s) 1-37 under 102(b) and 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of a different interpretation of previously applied reference and newly found art. Also, newly added claims 38-52, 54, 55, 57 and 58 have been rejected in view of applicable prior art.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian Ensey whose telephone number is 703-305-7363. The examiner can normally be reached on Mon-Fri: 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis Kuntz can be reached on 703-305-4708. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks
Washington, D.C. 20231

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Or faxed to:


(703) 872-9314, for formal communications intended for entry and for informal or draft communications, please label "PROPOSED" or "DRAFT".

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA., Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4700.

BKE

June 24, 2003


HUYEN LE
PRIMARY EXAMINER